

CLAIMS

1. A thin-film magnetic head comprising a tunnel magnetoresistive effect element and a resistor element connected in parallel with said tunnel magnetoresistive effect element, a resistance value R_{TMR} of said tunnel magnetoresistive effect element itself being $R_{\text{TMR}} \geq 240 \, \Omega$, a product RA of the resistance value of said tunnel magnetoresistive effect element itself and a cross-sectional area of said tunnel magnetoresistive effect element being $RA \geq 3 \, \Omega \cdot \mu\text{m}^2$, and a resistance value R_{PARA} of said resistor element being $R_{\text{PARA}} \leq 480 \, \Omega$.

2. The thin-film magnetic head as claimed in claim 1, wherein said thin-film magnetic head further comprises an upper electrode layer and a lower electrode layer connected to said tunnel magnetoresistive effect element, and wherein said resistor element is formed between said upper electrode layer and said lower electrode layer.

3. The thin-film magnetic head as claimed in claim 1, wherein said thin-film magnetic head further comprises electrode terminals and lead conductors connected between said tunnel magnetoresistive effect element and said electrode terminals, and wherein said resistor element is formed between said lead conductors.

4. The thin-film magnetic head as claimed in claim 1, wherein said tunnel magnetoresistive effect element further comprises a multi-layered structure of an under layer, a pinning layer, a pinned layer, a tunnel barrier layer and a free layer which are sequentially laminated.

5. A thin-film magnetic head comprising a tunnel magnetoresistive effect element and a resistor element connected in parallel with said tunnel magnetoresistive effect element, a resistance value R_{TMR} of said tunnel magnetoresistive effect element itself being $R_{TMR} \geq 240 \Omega$, a product RA of the resistance value of said tunnel magnetoresistive effect element itself and a cross-sectional area of said tunnel magnetoresistive effect element being $RA \geq 3 \Omega \cdot \mu m^2$, and a combined resistance value R_{TOTAL} of the resistance value R_{TMR} of said tunnel magnetoresistive effect element itself and a resistance value of said resistor element being $R_{TOTAL} \leq 160 \Omega$.

6. The thin-film magnetic head as claimed in claim 5, wherein said thin-film magnetic head further comprises an upper electrode layer and a lower electrode layer connected to said tunnel magnetoresistive effect element, and wherein said resistor element is formed between said upper electrode layer

and said lower electrode layer.

7. The thin-film magnetic head as claimed in claim 5, wherein said thin-film magnetic head further comprises electrode terminals and lead conductors connected between said tunnel magnetoresistive effect element and said electrode terminals, and wherein said resistor element is formed between said lead conductors.

8. The thin-film magnetic head as claimed in claim 5, wherein said tunnel magnetoresistive effect element further comprises a multi-layered structure of an under layer, a pinning layer, a pinned layer, a tunnel barrier layer and a free layer which are sequentially laminated.